CLAIMS

1-24. (cancelled)

25. (currently amended) A method for the spectral photometric determination of the oxygen saturation of the blood in optically accessible blood vessels comprising:

~~determining the intensity of the reflection of the blood vessels and their vessel-free environment based on at least two spectrally different images and on an empirically determined relationship between the oxygen saturation and a ratio of the intensities of the reflection of the blood vessels and their vessel-free environment; and~~

~~said determining step further comprising the steps of~~ illuminating simultaneously the blood vessels and their vessel-free environment ~~simultaneously~~ exclusively by wavelengths used for subsequent data gathering, wherein the wavelengths used for subsequent data gathering consist of at least one measurement wavelength and at least one reference wavelength of an illumination beam for recording ~~the~~ spectrally different images, ~~and tuning~~ wherein ~~every~~ the measurement wavelength is a wavelength at which the reflection of oxygenated and reduced hemoglobin differs, ~~and~~ wherein the reference wavelength is an isosbestic wavelength of hemoglobin, and wherein every measurement is tuned, respectively, to a color channel of a color camera used to record the images in order to be received by this color channel;

capturing at least two spectrally different images of the blood vessels and their vessel-free environment;

determining the intensity of reflection of the blood vessels and their vessel-free environment; and

determining the oxygen saturation of the blood from a linear, empirically-determined function between the oxygen saturation and a logarithmized ratio of the intensities of the reflection of the blood vessels and their vessel-free environment at the measurement wavelength and at the isosbestic wavelength, wherein the slope and linear term of the function are determined empirically from readings at a plurality of blood vessels.

26-27. (cancelled)

28. (currently amended) The method according to claim ~~27~~25, wherein disturbances caused by a dependency of the oxygen saturation on the vessel diameter and on the pigmentation of the environment of the blood vessels are compensated by correctives that are empirically determined and taken into consideration additively.

29. (previously presented) The method according to claim 28, wherein the corrective for compensating for the influence of the vessel diameter is a linear function of the vessel diameter, and its slope and linear term are determined empirically.

30. (previously presented) The method according to claim 28, wherein the corrective for compensating for the influence of the pigmentation of the environment of the blood vessels is a linear function of the pigmentation, and its slope and linear term are empirically determined.

31. (previously presented) The method according to claim 30, wherein the pigmentation of the environment of the blood vessels is determined by the logarithm of the quotient of the reflection values of the environment of the blood vessels at the measurement wavelength and at the isosbestic wavelength.

32. (previously presented) The method according to claim 25, wherein arteries and veins are distinguished based on the quotient of the logarithmized reflection ratios in the vessel-free environment of the blood vessel and on the blood vessel at the measurement wavelength and at the isosbestic wavelength.

33. (previously presented) The method according to claim 25, wherein the blood vessels, their direction and their vessel-free environment are detected automatically by image-processing means or manually.

34. (previously presented) The method according to claim 33, wherein, perpendicular to the direction of the blood vessel, an average is taken over the reflection values of all of the image points associated with the blood vessel.

35. (previously presented) The method according to claim 34, wherein a plurality of reflection values which are averaged perpendicular to the direction of the blood vessel is determined along the direction of the blood vessel, and the average is taken over these averaged reflection values.

36. (previously presented) The method according to claim 35, wherein specular reflections on the blood vessels are identified and eliminated automatically through image-processing means or manually.

37. (previously presented) The method according to claim 25, wherein the oxygen saturation is determined in reaction to physiological provocation or stimulation.

38. (previously presented) The method according to claim 37, wherein the physiological provocation or stimulation is brought about by flicker light.

39. (previously presented) The method according to claim 38, wherein light from at least one light source is modified through programming techniques by a light manipulator arranged in an illumination beam path of an image-generating device, and wherein the modified light is used for illumination and for selective provocation or stimulation.

40. (previously presented) The method according to claim 37, wherein the physiological provocation or stimulation is brought about by inhalation of oxygen by the test subject.

41. (cancelled)

42. (previously presented) The method according to claim 25, wherein an image is prepared of the structure of the blood vessel in which the oxygen saturation is coded.

43. (previously presented) The method according to claim 25, wherein an image is prepared of the structure of the blood vessel in which the blood vessels with pathological oxygen saturation are marked.

44. (cancelled)

45. (previously presented) The method according to claim 25, wherein systolic and diastolic differences in oxygen saturation are obtained as diagnostic features by recording pulse-synchronized sequences of images.

46-48. (cancelled)